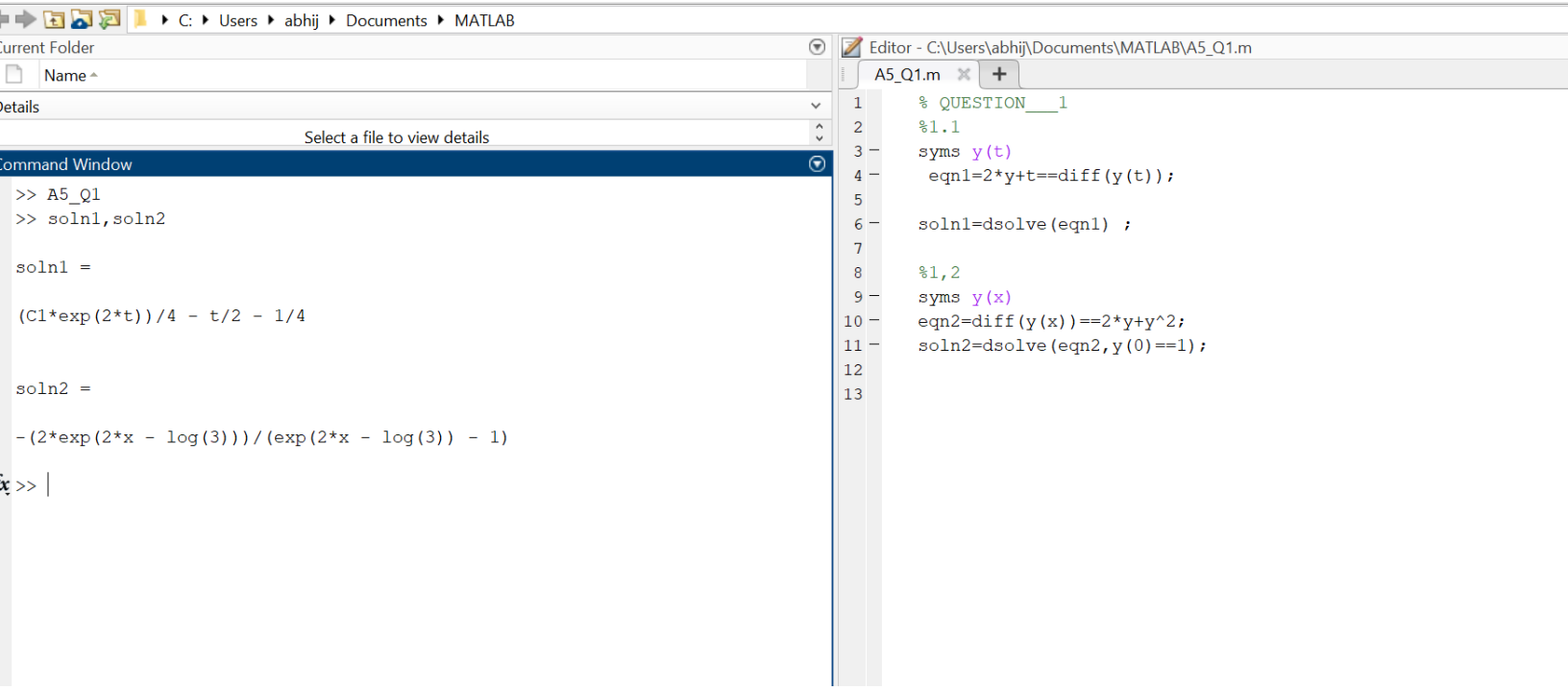
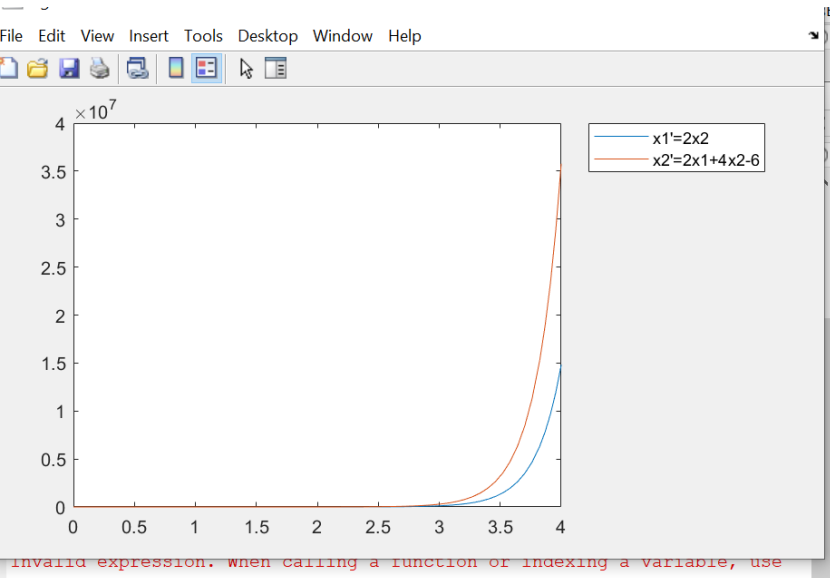
Name:Abhijeet Deshmukh
Mis:111909002
batch:A
sy:20-21

Q1:dsolve


C: ▸ Users ▸ abhij ▸ Documents ▸ MATLAB
Current Folder
Name
Details
Select a file to view details
Command Window
>> A5_Q1
>> soln1,soln2
soln1 =
(C1*exp(2*t))/4 - t/2 - 1/4
soln2 =
-(2*exp(2*x - log(3)))/(exp(2*x - log(3)) - 1)
>>
Editor - C:\Users\abhij\Documents\MATLAB\A5_Q1.m
A5_Q1.m
1 % QUESTION___1
2 %1.1
3 syms y(t)
4 eqn1=2*y+t==diff(y(t));
5
6 soln1=dsolve(eqn1) ;
7
8 %1,2
9 syms y(x)
10 eqn2=diff(y(x))==2*y+y^2;
11 soln2=dsolve(eqn2,y(0)==1);
12
13

Q2.1:ode45




```
Invalid expression. When calling a function or indexing a variable, use
parentheses. Otherwise, check for mismatched delimiters.

>> A5_Q2
>> A5_Q2
```

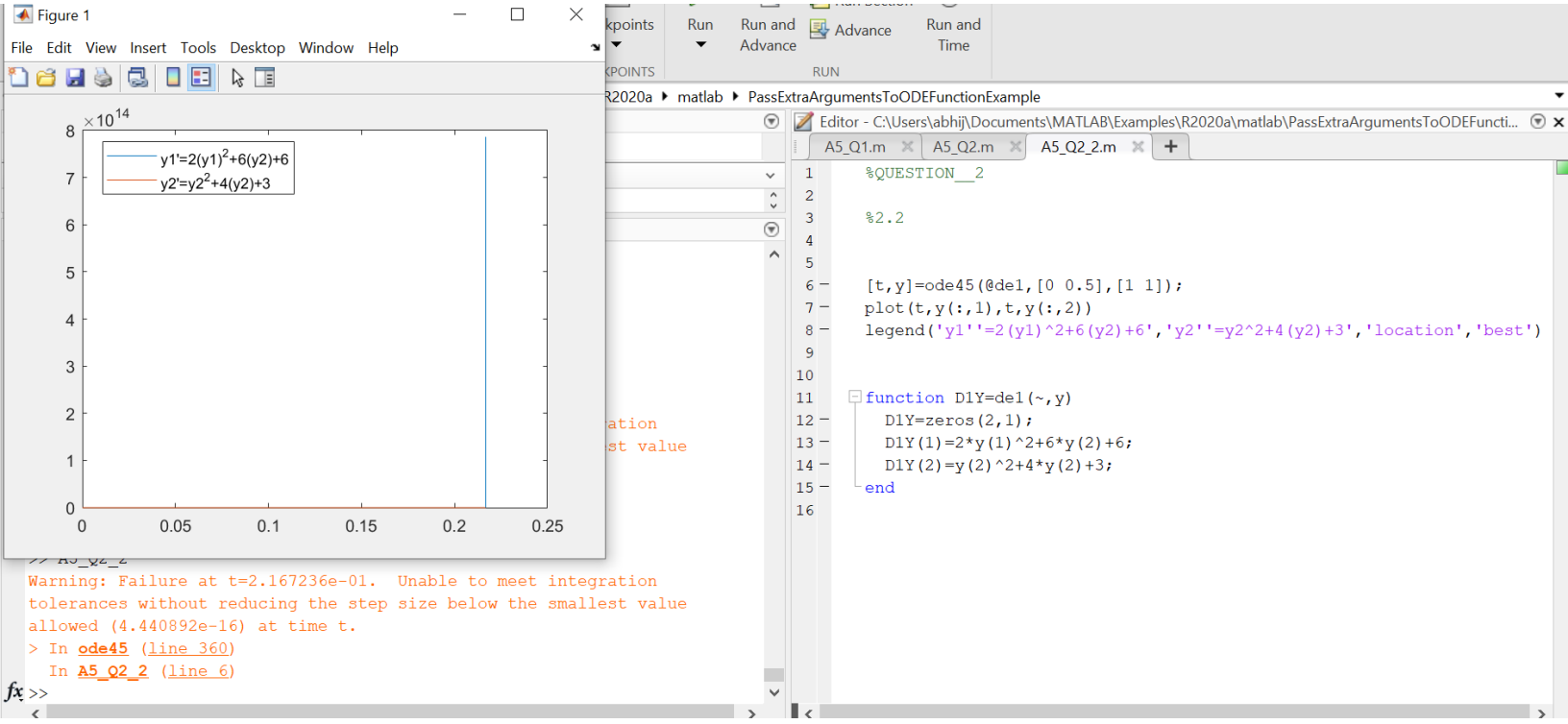
ExtraArgumentsToODEFunctionExample

Editor - C:\Users\abhij\Documents\MATLAB\A5_Q2.m

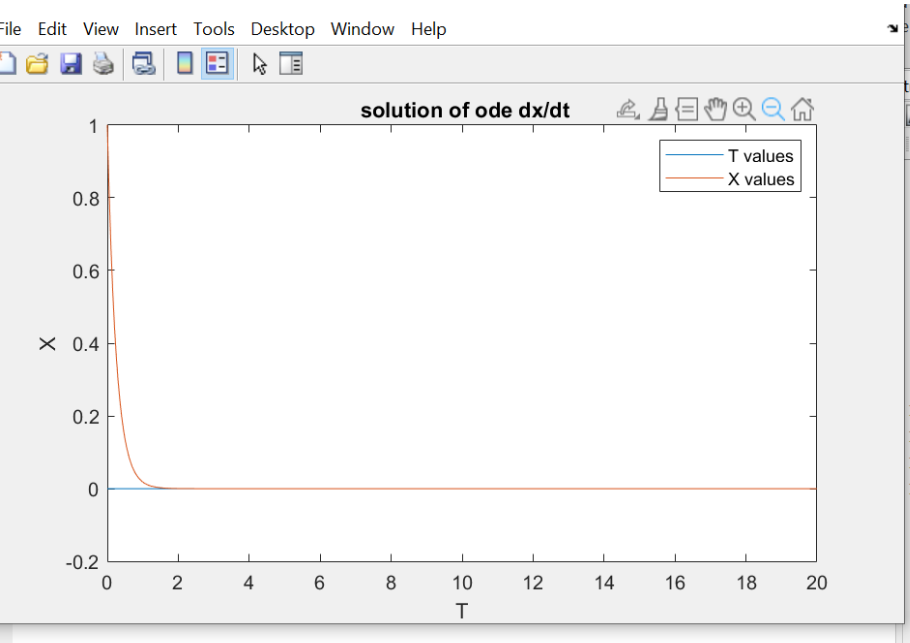
A5_Q1.m | A5_Q2.m

```
1   %QUESTION___2
2
3   %2.1
4
5
6
7
8   [t,x]=ode45(@del,[0 4],[1 1]);
9   plot(t,x(:,1),t,x(:,2))
10  legend('x1''=2x2','x2''=2x1+4x2-6','location','bestoutside')
11
12
13  function D1X=del(~,x)
14    D1X=zeros(2,1);
15    D1X(1)=2*x(2);
16    D1X(2)=2*x(1)+4*x(2)-6;
17  end
18
```

Q2.2:ode45_singularity case



Q3:ode45



Advance
Time
RUN

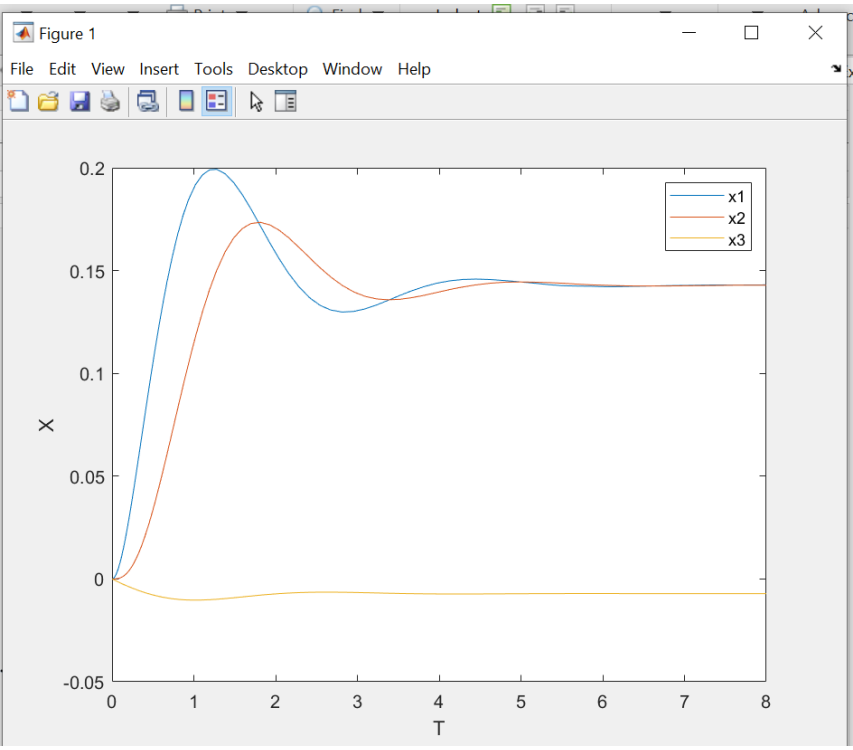
traArgumentsToODEFunctionExample

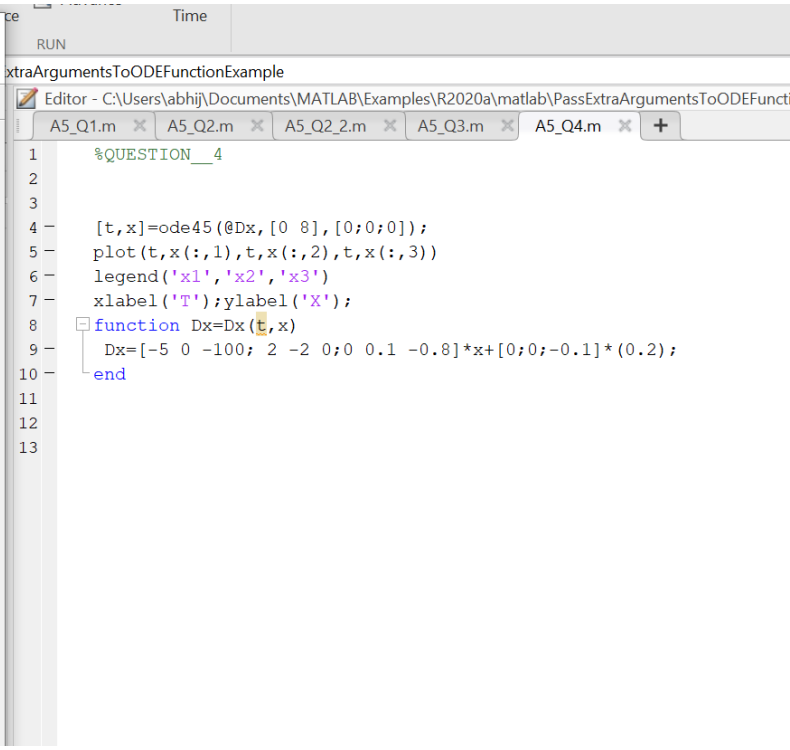
Editor - C:\Users\abhij\Documents\MATLAB\Examples\R2020a\matlab\PassExtraArguments

A5_Q1.m | A5_Q2.m | A5_Q2_2.m | A5_Q3.m

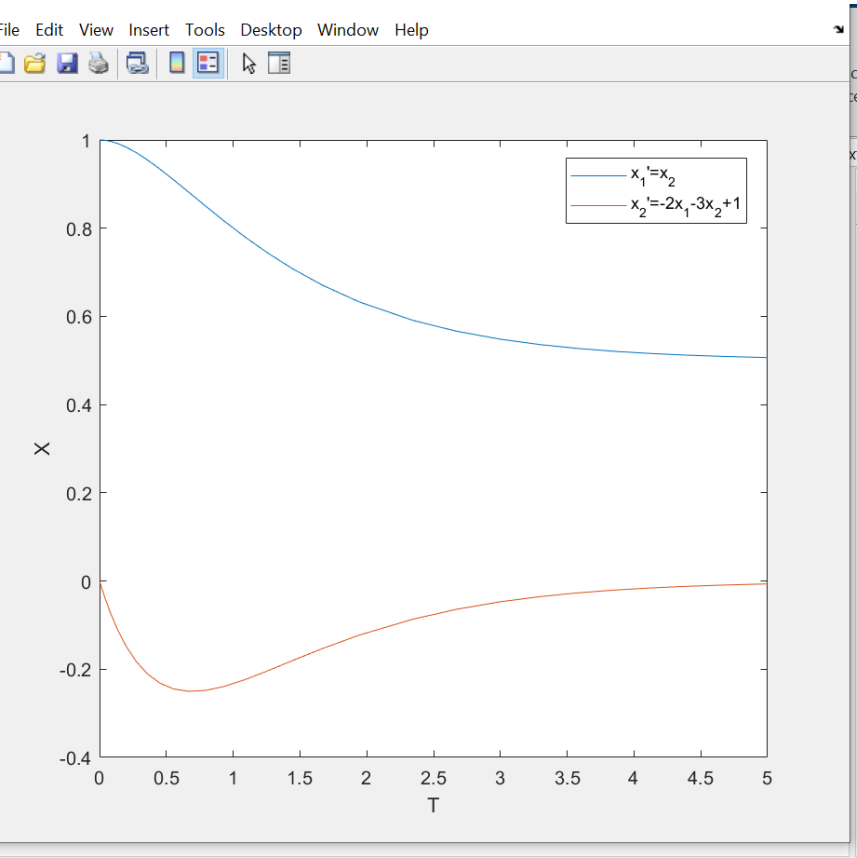
```
1   %QUESTION__3
2
3   [T,X]=ode45(@odefunc,[0 20],[0 1]);
4
5   plot(T,X); xlabel('T') ;ylabel('X');
6   legend('T values','X values')
7   title(' solution of ode dx/dt')
8
9   function DX=odefunc(t,x)
10
11   DX=-4*x;
12  end
13
```

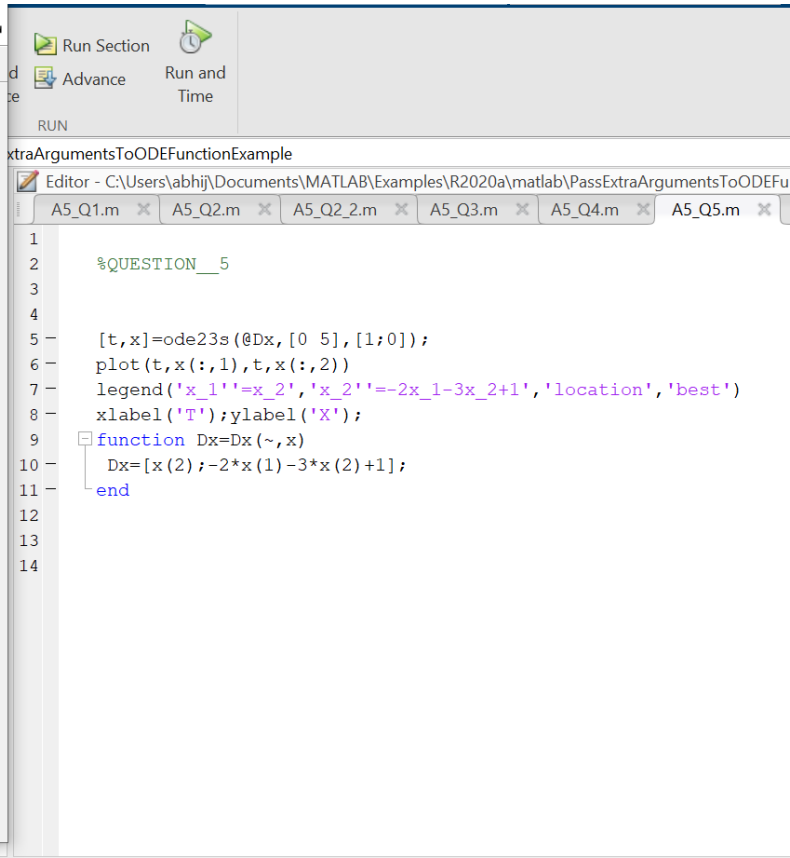
Q4:ode45_matrix form



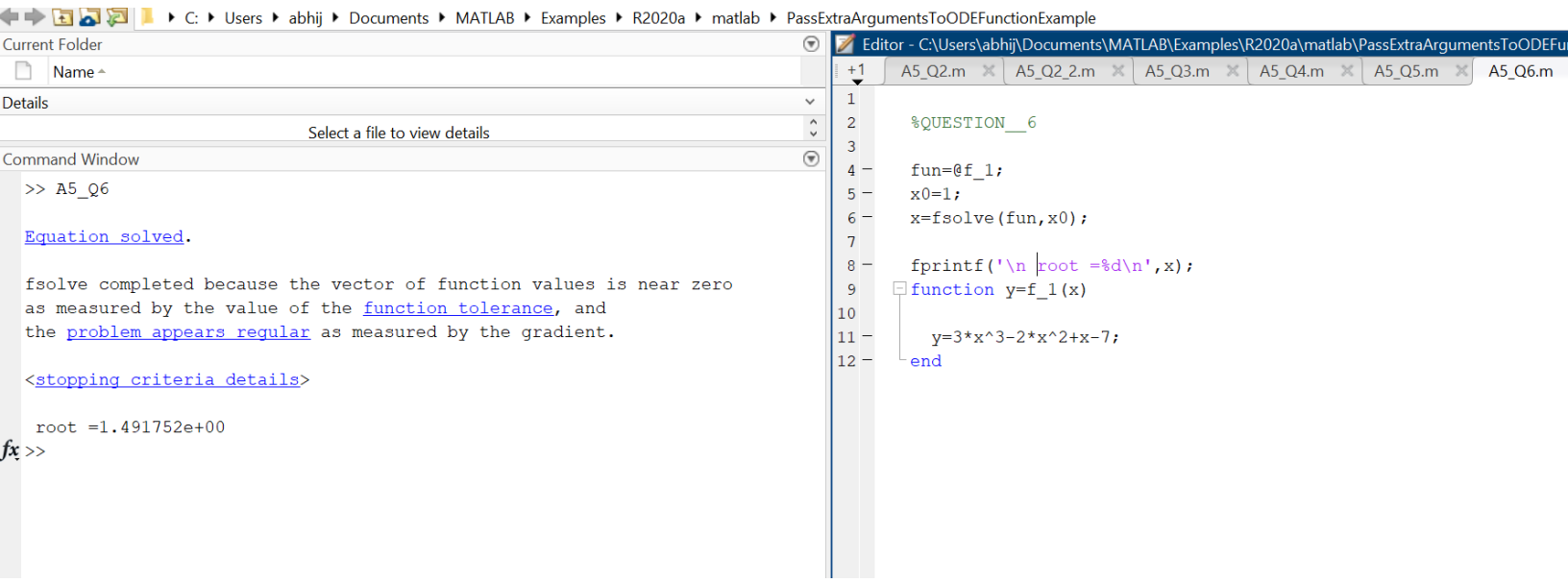


Q5:Ode23s

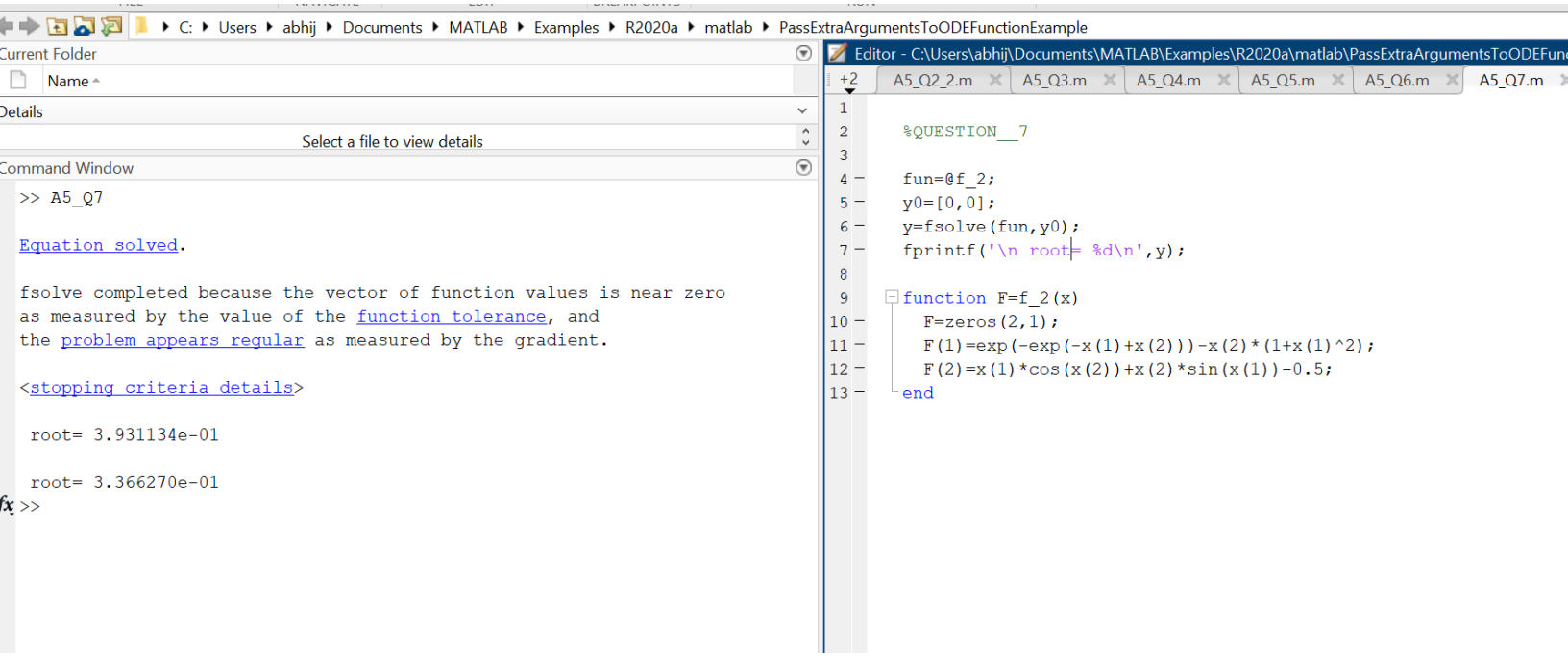

File Edit View Insert Tools Desktop Window Help
x1'=x2
x2'=-2x1-3x2+1
X
T
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5


Run Section
Advance
Run and Time
RUN
xtraArgumentsToODEFunctionExample
Editor - C:\Users\abhij\Documents\MATLAB\Examples\R2020a\matlab\PassExtraArgumentsToODEFu
A5_Q1.m
A5_Q2.m
A5_Q2_2.m
A5_Q3.m
A5_Q4.m
A5_Q5.m
%QUESTION__5
[t,x]=ode23s(@Dx,[0 5],[1;0]);
plot(t,x(:,1),t,x(:,2))
legend('x_1''=x_2','x_2''=-2x_1-3x_2+1','location','best')
xlabel('T');ylabel('X');
function Dx=Dx(~,x)
Dx=[x(2);-2*x(1)-3*x(2)+1];
end

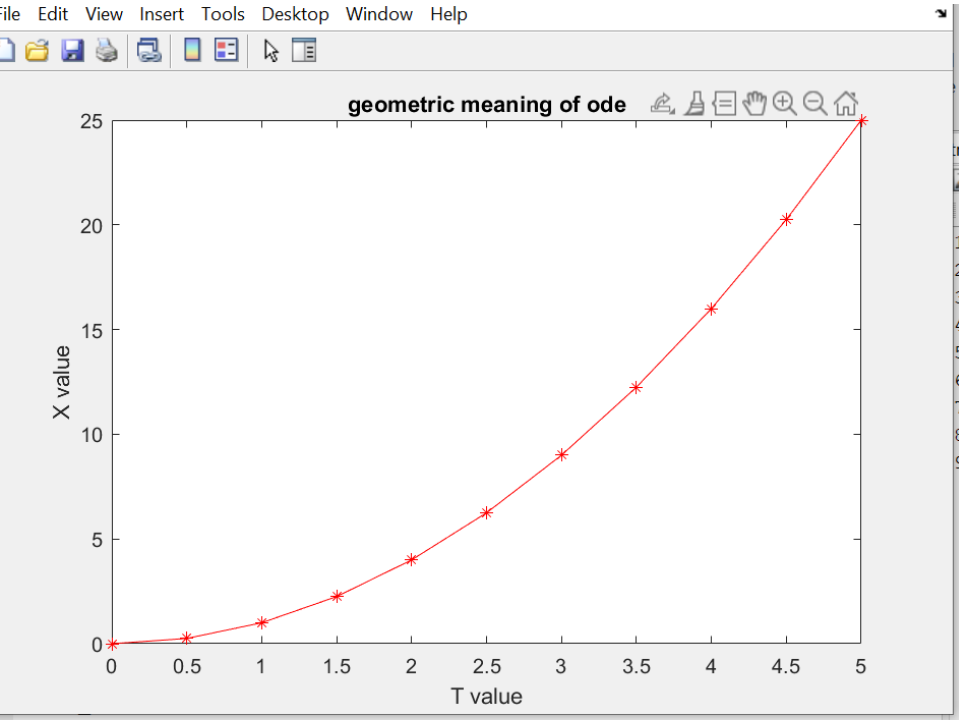
Q6:fsolve


C: Users abhij Documents MATLAB Examples R2020a matlab PassExtraArgumentsToODEFunctionExample
Current Folder
Name
Details
Select a file to view details
Command Window
>> A5_Q6
Equation solved.
fsolve completed because the vector of function values is near zero
as measured by the value of the function tolerance, and
the problem appears regular as measured by the gradient.
<stopping criteria details>
root =1.491752e+00
>>
Editor - C:\Users\abhij\Documents\MATLAB\Examples\R2020a\matlab\PassExtraArgumentsToODEFu
A5_Q2.m
A5_Q2_2.m
A5_Q3.m
A5_Q4.m
A5_Q5.m
A5_Q6.m
%QUESTION__6
fun=@f_1;
x0=1;
x=fsolve(fun,x0);
fprintf('\n root =%d\n',x);
function y=f_1(x)
y=3*x^3-2*x^2+x-7;
end

Q7:fsolve_2D_roots



Q8: geometric representation of ode using ode23




```
>> A5_Q8
>> A5_Q8
>>
```

Run Section
Advance
Run and Time
RUN

traArgumentsToODEFunctionExample

Editor - C:\Users\abhij\Documents\MATLAB\Examples\R2020a\matlab\PassExtra

+3 | A5_Q3.m | A5_Q4.m | A5_Q5.m | A5_Q6.m | A5_Q7.m

```
% QUESTION__8

tspan = [0 5];
y0 = 0;
[t,y] = ode23(@(t,y) 2*t, tspan, y0);
plot(t,y,'-C*','color','r')
xlabel('T value');ylabel('X value');
title('geometric meaning of ode')
```